

## PATENT COOPERATION TREATY

From the INTERNATIONAL BUREAU

PCT

## NOTIFICATION OF ELECTION

(PCT Rule 61.2)

To:

Commissioner  
US Department of Commerce  
United States Patent and Trademark  
Office, PCT  
2011 South Clark Place Room  
CP2/5C24  
Arlington, VA 22202  
ETATS-UNIS D'AMERIQUE

in its capacity as elected Office

Date of mailing (day/month/year) 07 March 2001 (07.03.01)	
International application No. PCT/US00/17561	Applicant's or agent's file reference SP-0840.3 WO
International filing date (day/month/year) 21 June 2000 (21.06.00)	Priority date (day/month/year) 23 June 1999 (23.06.99)
Applicant JIN, Zhihong et al	

1. The designated Office is hereby notified of its election made:

☒ in the demand filed with the International Preliminary Examining Authority on:

08 January 2001 (08.01.01)

☐ in a notice effecting later election filed with the International Bureau on:

2. The election
- ☒
- was

☐ was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No.: (41-22) 740.14.35	Authorized officer Juan Cruz Telephone No.: (41-22) 338.83.38
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# TENT COOPERATION TREATY

# PCT

## INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference <b>SP-0840.3 WO</b>	<b>FOR FURTHER ACTION</b> see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.	
International application No. <b>PCT/US 00/ 17561</b>	International filing date (day/month/year) <b>21/06/2000</b>	(Earliest) Priority Date (day/month/year) <b>23/06/1999</b>
Applicant  <b>EVEREADY BATTERY COMPANY, INC. et al.</b>		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 4 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

**1. Basis of the report**

- a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
- ☐ the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).
- b. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international search was carried out on the basis of the sequence listing :
- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2. ☐ **Certain claims were found unsearchable** (See Box I).

3. ☐ **Unity of Invention is lacking** (see Box II).

**4. With regard to the title,**

- ☒ the text is approved as submitted by the applicant.
- ☐ the text has been established by this Authority to read as follows:

**5. With regard to the abstract,**

- ☐ the text is approved as submitted by the applicant.
- ☒ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

**6. The figure of the drawings to be published with the abstract is Figure No.**

- ☐ as suggested by the applicant.
- ☐ because the applicant failed to suggest a figure.
- ☐ because this figure better characterizes the invention.

☒ None of the figures.

## Box III TEXT OF THE ABSTRACT (Continuation of item 5 of the first sheet)

Alkaline battery cells comprising an anode, a cathode, a separator between the anode and the cathode, and an electrolyte are provided with an n-type metal oxide additive that improves electrochemical performance. The n-type metal oxide additive is either a doped metal oxide comprising a metal oxide modified by incorporation of a dopant, or a reduced metal oxide.

The metal oxide may be selected from the group consisting of

$\text{BaTiO}_3$ ,  $\text{K}_2\text{TiO}_3$ ,  $\text{CoTiO}_3$ ,  $\text{SrTiO}_3$ ,  $\text{CaTiO}_3$ ,  $\text{MgTiO}_3$ ,  $\text{SiO}_2$ ,  $\text{CaO}$ ,  $\text{TiO}_2$ ,  $\text{CoO}$ ,

$\text{Co}_3\text{O}_4$ ,  $\text{ZnO}$ ,  $\text{SnO}$ ,  $\text{SnO}_2$ ,  $\text{PbO}_2$ ,  $\text{Bi}_2\text{O}_3$ ,  $\text{Bi}_2\text{O}_3 \cdot 3\text{ZrO}_3$ ,  $\text{Bi}_{12}\text{TiO}_{20}$ ,  $\text{Fe}_2\text{O}_3$ - $\text{TiO}_2$ ,  $\text{Nb}_2\text{O}_5$ ,

$\text{CaWO}_4$ ,  $\text{ZnMn}_2\text{O}_4$ , and  $\text{K}_2\text{Cr}_2\text{O}_7$ .

Examples of dopant disclosed are:

$\text{NbO}_2$ ,  $\text{Nb}_2\text{O}_5$ ,  $\text{Ta}_2\text{O}_5$ ,  $\text{WO}_3$ ,  $\text{GeO}_2$ ,  $\text{ZrO}_2$ ,  $\text{SnO}_2$ ,  $\text{ThO}_2$ ,

$\text{Fe}_2\text{O}_3$ ,  $\text{In}_2\text{O}_3$ ,  $\text{LiNiO}_2$  and  $\text{P}_2\text{O}_5$ ,  $\text{In}_2\text{O}_3$ ,  $\text{Sb}_2\text{O}_5$ .

## INTERNATIONAL SEARCH REPORT

International Application No.

/US 00/17561

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 H01M4/62 H01M6/16

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 H01M

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 747 982 A (EVEREADY BATTERY INC) 11 December 1996 (1996-12-11) claims 1-19 ---	1-3, 5-8, 13
X	WO 98 15987 A (MERCK PATENT GMBH ; PFAFF GERHARD (DE); GLAUSCH RALF (DE); HILARIUS) 16 April 1998 (1998-04-16) page 7, line 10 - line 15; claims 1-10 ---	1-3, 5-7
A	US 5 532 085 A (DAVIS STUART M ET AL) 2 July 1996 (1996-07-02) claims 1-14 ---	1-23
A	WO 92 17910 A (BATTERY TECHNOLOGIES INC) 15 October 1992 (1992-10-15) claims 1-4 --- -/--	1-23

☒ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

## \* Special categories of cited documents :

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier document but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search

29 September 2000

Date of mailing of the international search report

18/10/2000

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2  
NL - 2280 HV Rijswijk  
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,  
Fax: (+31-70) 340-3016

Authorized officer

Battistig, M

## INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 00/17561

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	DE 195 46 333 A (GRILLO WERKE AG) 20 June 1996 (1996-06-20) claims 1-7 ---	1-23
A	US 5 895 734 A (NARDI JOHN C ET AL) 20 April 1999 (1999-04-20) claims 1-4 -----	1-23

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 00/17561

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
EP 0747982	A	11-12-1996	US 5599644 A	04-02-1997
			CA 2178423 A	08-12-1996
			CN 1147703 A	16-04-1997
			DE 69606352 D	02-03-2000
			DE 69606352 T	24-08-2000
			JP 9106811 A	22-04-1997
			SG 68585 A	16-11-1999
WO 9815987	A	16-04-1998	DE 19641970 A	16-04-1998
			DE 19728614 A	07-01-1999
			AU 4706597 A	05-05-1998
			CN 1233348 A	27-10-1999
			EP 0931362 A	28-07-1999
US 5532085	A	02-07-1996	AU 5434396 A	19-03-1997
			BR 9610196 A	11-08-1998
			CA 2229564 A	06-03-1997
			EP 0852821 A	15-07-1998
			WO 9708770 A	06-03-1997
			ZA 9601298 A	27-08-1996
WO 9217910	A	15-10-1992	HU 211445 B	28-11-1995
			AU 1458592 A	02-11-1992
DE 19546333	A	20-06-1996	NONE	
US 5895734	A	20-04-1999	NONE	

# PCT

## REQUEST

The undersigned requests that the present international application be processed according to the Patent Cooperation Treaty.

Express Mail No. EJ353318125US

For receiving Office use only

International Application No.

International Filing Date

Name of receiving Office and "PCT International Application"

Applicant's or agent's file reference  
(if desired) (12 characters maximum) SP-0840.3 WO

**Box No. I TITLE OF INVENTION**

Performance Enhancing Additives For Electrochemical Cells

**Box No. II APPLICANT**

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

Eveready Battery Company, Inc.  
P. O. Box 450777  
25225 Detroit Road  
Westlake, Ohio 44145  
United States of America

☐ This person is also inventor.

Telephone No.  
(440) 835-7343

Facsimile No.  
(440) 899-6072

Teleprinter No.

State (that is, country) of nationality:  
US

State (that is, country) of residence:  
US

This person is applicant for the purposes of: ☐ all designated States ☒ all designated States except the United States of America ☐ the United States of America only ☐ the States indicated in the Supplemental Box

**Box No. III FURTHER APPLICANT(S) AND/OR (FURTHER) INVENTOR(S)**

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

Jin, Zhihong  
1106 Starlight Lane  
Cottage Grove, WI 53527  
United States of America

This person is:

☐ applicant only

☒ applicant and inventor

☐ inventor only (If this check-box is marked, do not fill in below.)

State (that is, country) of nationality:  
US

State (that is, country) of residence:  
US

This person is applicant for the purposes of: ☐ all designated States ☐ all designated States except the United States of America ☒ the United States of America only ☐ the States indicated in the Supplemental Box

☒ Further applicants and/or (further) inventors are indicated on a continuation sheet.

**Box No. IV AGENT OR COMMON REPRESENTATIVE; OR ADDRESS FOR CORRESPONDENCE**

The person identified below is hereby/has been appointed to act on behalf of the applicant(s) before the competent International Authorities as:

☒ agent ☐ common representative

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)

Toye, Russell H., Jr.  
Eveready Battery Company, Inc.  
P. O. Box 450777  
25225 Detroit Road  
Westlake, Ohio 44145  
United States of America

Telephone No.  
(440) 835-7343

Facsimile No.  
(440) 899-6072

Teleprinter No.

☐ Address for correspondence: Mark this check-box where no agent or common representative is/has been appointed and the space above is used instead to indicate a special address to which correspondence should be sent.

Continuation of Box No. III FURTHER APPLICANTS AND/OR (FURTHER) INVENTOR(S)	
<i>If none of the following sub-boxes is used, this sheet is not to be included in the request.</i>	
<p>Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)</p> <p>Kennedy, John H. 5357 Agana Drive Santa Barbara, CA 93111-1601 United States of America</p>	<p>This person is:</p> <p><input type="checkbox"/> applicant only</p> <p><input checked="" type="checkbox"/> applicant and inventor</p> <p><input type="checkbox"/> inventor only (If this check-box is marked, do not fill in below.)</p>
State (that is, country) of nationality: US	State (that is, country) of residence: US
<p>This person is applicant for the purposes of: <input type="checkbox"/> all designated States <input type="checkbox"/> all designated States except the United States of America <input checked="" type="checkbox"/> the United States of America only <input type="checkbox"/> the States indicated in the Supplemental Box</p>	
<p>Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)</p>	<p>This person is:</p> <p><input type="checkbox"/> applicant only</p> <p><input type="checkbox"/> applicant and inventor</p> <p><input type="checkbox"/> inventor only (If this check-box is marked, do not fill in below.)</p>
State (that is, country) of nationality:	State (that is, country) of residence:
<p>This person is applicant for the purposes of: <input type="checkbox"/> all designated States <input type="checkbox"/> all designated States except the United States of America <input type="checkbox"/> the United States of America only <input type="checkbox"/> the States indicated in the Supplemental Box</p>	
<p>Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)</p>	<p>This person is:</p> <p><input type="checkbox"/> applicant only</p> <p><input type="checkbox"/> applicant and inventor</p> <p><input type="checkbox"/> inventor only (If this check-box is marked, do not fill in below.)</p>
State (that is, country) of nationality:	State (that is, country) of residence:
<p>This person is applicant for the purposes of: <input type="checkbox"/> all designated States <input type="checkbox"/> all designated States except the United States of America <input type="checkbox"/> the United States of America only <input type="checkbox"/> the States indicated in the Supplemental Box</p>	
<p>Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)</p>	<p>This person is:</p> <p><input type="checkbox"/> applicant only</p> <p><input type="checkbox"/> applicant and inventor</p> <p><input type="checkbox"/> inventor only (If this check-box is marked, do not fill in below.)</p>
State (that is, country) of nationality:	State (that is, country) of residence:
<p>This person is applicant for the purposes of: <input type="checkbox"/> all designated States <input type="checkbox"/> all designated States except the United States of America <input type="checkbox"/> the United States of America only <input type="checkbox"/> the States indicated in the Supplemental Box</p>	
<p>Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)</p>	<p>This person is:</p> <p><input type="checkbox"/> applicant only</p> <p><input type="checkbox"/> applicant and inventor</p> <p><input type="checkbox"/> inventor only (If this check-box is marked, do not fill in below.)</p>
State (that is, country) of nationality:	State (that is, country) of residence:
<p>This person is applicant for the purposes of: <input type="checkbox"/> all designated States <input type="checkbox"/> all designated States except the United States of America <input type="checkbox"/> the United States of America only <input type="checkbox"/> the States indicated in the Supplemental Box</p>	
<p><input type="checkbox"/> Further applicants and/or (further) inventors are indicated on another continuation sheet.</p>	



**Box No.V DESIGNATION OF STATES**

The following designations are hereby made under Rule 4.9(a) (mark the applicable check-boxes; at least one must be marked):

**Regional Patent**

- ☒ **AP ARIPO Patent:** GH Ghana, GM Gambia, KE Kenya, LS Lesotho, MW Malawi, SD Sudan, SL Sierra Leone, SZ Swaziland, TZ United Republic of Tanzania, UG Uganda, ZW Zimbabwe, and any other State which is a Contracting State of the Harare Protocol and of the PCT
- ☒ **EA Eurasian Patent:** AM Armenia, AZ Azerbaijan, BY Belarus, KG Kyrgyzstan, KZ Kazakhstan, MD Republic of Moldova, RU Russian Federation, TJ Tajikistan, TM Turkmenistan, and any other State which is a Contracting State of the Eurasian Patent Convention and of the PCT
- ☒ **EP European Patent:** AT Austria, BE Belgium, CH and LI Switzerland and Liechtenstein, CY Cyprus, DE Germany, DK Denmark, ES Spain, FI Finland, FR France, GB United Kingdom, GR Greece, IE Ireland, IT Italy, LU Luxembourg, MC Monaco, NL Netherlands, PT Portugal, SE Sweden, and any other State which is a Contracting State of the European Patent Convention and of the PCT
- ☒ **OA OAPI Patent:** BF Burkina Faso, BJ Benin, CF Central African Republic, CG Congo, CI Côte d'Ivoire, CM Cameroon, GA Gabon, GN Guinea, GW Guinea-Bissau, ML Mali, MR Mauritania, NE Niger, SN Senegal, TD Chad, TG Togo, and any other State which is a member State of OAPI and a Contracting State of the PCT (if other kind of protection or treatment desired, specify on dotted line) .....

**National Patent (if other kind of protection or treatment desired, specify on dotted line):**

- |  |  |
|--|--|
| <input checked="" type="checkbox"/> AE United Arab Emirates                  | <input checked="" type="checkbox"/> LR Liberia   |
| <input checked="" type="checkbox"/> AL Albania                               | <input checked="" type="checkbox"/> LS Lesotho   |
| <input checked="" type="checkbox"/> AM Armenia                               | <input checked="" type="checkbox"/> LT Lithuania   |
| <input checked="" type="checkbox"/> AT Austria                               | <input checked="" type="checkbox"/> LU Luxembourg  |
| <input checked="" type="checkbox"/> AU Australia                             | <input checked="" type="checkbox"/> LV Latvia  |
| <input checked="" type="checkbox"/> AZ Azerbaijan                            | <input checked="" type="checkbox"/> MA Morocco   |
| <input checked="" type="checkbox"/> BA Bosnia and Herzegovina                | <input checked="" type="checkbox"/> MD Republic of Moldova   |
| <input checked="" type="checkbox"/> BB Barbados                              | <input checked="" type="checkbox"/> MG Madagascar  |
| <input checked="" type="checkbox"/> BG Bulgaria                              | <input checked="" type="checkbox"/> MK The former Yugoslav Republic of Macedonia                             |
| <input checked="" type="checkbox"/> BR Brazil                                | <input checked="" type="checkbox"/> MN Mongolia  |
| <input checked="" type="checkbox"/> BY Belarus                               | <input checked="" type="checkbox"/> MW Malawi  |
| <input checked="" type="checkbox"/> CA Canada                                | <input checked="" type="checkbox"/> MX Mexico  |
| <input checked="" type="checkbox"/> CH and LI Switzerland and Liechtenstein  | <input checked="" type="checkbox"/> NO Norway  |
| <input checked="" type="checkbox"/> CN China                                 | <input checked="" type="checkbox"/> NZ New Zealand   |
| <input checked="" type="checkbox"/> CR Costa Rica                            | <input checked="" type="checkbox"/> PL Poland  |
| <input checked="" type="checkbox"/> CU Cuba                                  | <input checked="" type="checkbox"/> PT Portugal  |
| <input checked="" type="checkbox"/> CZ Czech Republic                        | <input checked="" type="checkbox"/> RO Romania   |
| <input checked="" type="checkbox"/> DE Germany                               | <input checked="" type="checkbox"/> RU Russian Federation  |
| <input checked="" type="checkbox"/> DK Denmark                               | <input checked="" type="checkbox"/> SD Sudan   |
| <input checked="" type="checkbox"/> DM Dominica                              | <input checked="" type="checkbox"/> SE Sweden  |
| <input checked="" type="checkbox"/> EE Estonia                               | <input checked="" type="checkbox"/> SG Singapore   |
| <input checked="" type="checkbox"/> ES Spain                                 | <input checked="" type="checkbox"/> SI Slovenia  |
| <input checked="" type="checkbox"/> FI Finland                               | <input checked="" type="checkbox"/> SK Slovakia  |
| <input checked="" type="checkbox"/> GB United Kingdom                        | <input checked="" type="checkbox"/> SL Sierra Leone  |
| <input checked="" type="checkbox"/> GD Grenada                               | <input checked="" type="checkbox"/> TJ Tajikistan  |
| <input checked="" type="checkbox"/> GE Georgia                               | <input checked="" type="checkbox"/> TM Turkmenistan  |
| <input checked="" type="checkbox"/> GH Ghana                                 | <input checked="" type="checkbox"/> TR Turkey  |
| <input checked="" type="checkbox"/> GM Gambia                                | <input checked="" type="checkbox"/> TT Trinidad and Tobago   |
| <input checked="" type="checkbox"/> HR Croatia                               | <input checked="" type="checkbox"/> TZ United Republic of Tanzania   |
| <input checked="" type="checkbox"/> HU Hungary                               | <input checked="" type="checkbox"/> UA Ukraine   |
| <input checked="" type="checkbox"/> ID Indonesia                             | <input checked="" type="checkbox"/> UG Uganda  |
| <input checked="" type="checkbox"/> IL Israel                                | <input checked="" type="checkbox"/> US United States of America  |
| <input checked="" type="checkbox"/> IN India                                 | <input checked="" type="checkbox"/> UZ Uzbekistan  |
| <input checked="" type="checkbox"/> IS Iceland                               | <input checked="" type="checkbox"/> VN Viet Nam  |
| <input checked="" type="checkbox"/> JP Japan                                 | <input checked="" type="checkbox"/> YU Yugoslavia  |
| <input checked="" type="checkbox"/> KE Kenya                                 | <input checked="" type="checkbox"/> ZA South Africa  |
| <input checked="" type="checkbox"/> KG Kyrgyzstan                            | <input checked="" type="checkbox"/> ZW Zimbabwe  |
| <input checked="" type="checkbox"/> KP Democratic People's Republic of Korea |  |
| <input checked="" type="checkbox"/> KR Republic of Korea                     | Check-boxes reserved for designating States which have become party to the PCT after issuance of this sheet: |
| <input checked="" type="checkbox"/> KZ Kazakhstan                            | <input type="checkbox"/> .....   |
| <input checked="" type="checkbox"/> LC Saint Lucia                           | <input type="checkbox"/> .....   |
| <input checked="" type="checkbox"/> LK Sri Lanka                             |  |

**Precautionary Designation Statement:** In addition to the designations made above, the applicant also makes under Rule 4.9(b) all other designations which would be permitted under the PCT except any designation(s) indicated in the Supplemental Box as being excluded from the scope of this statement. The applicant declares that those additional designations are subject to confirmation and that any designation which is not confirmed before the expiration of 15 months from the priority date is to be regarded as withdrawn by the applicant at the expiration of that time limit. (Confirmation (including fees) must reach the receiving Office within the 15-month time limit.)

**Supplemental Box**      *If the Supplemental Box is not used, this sheet need not be included in the request.*

1. If, in any of the Boxes, the space is insufficient to furnish all the information: in such case, write "Continuation of Box No. ..." [indicate the number of the Box] and furnish the information in the same manner as required according to the captions of the Box in which the space was insufficient, in particular:

- (i) if more than two persons are involved as applicants and/or inventors and no "continuation sheet" is available: in such case, write "Continuation of Box No. III" and indicate for each additional person the same type of information as required in Box No. III. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below;
- (ii) if, in Box No. II or in any of the sub-boxes of Box No. III, the indication "the States indicated in the Supplemental Box" is checked: in such case, write "Continuation of Box No. II" or "Continuation of Box No. III" or "Continuation of Boxes No. II and No. III" (as the case may be), indicate the name of the applicant(s) involved and, next to (each) such name, the State(s) (and/or, where applicable, ARIPO, Eurasian, European or OAPI patent) for the purposes of which the named person is applicant;
- (iii) if, in Box No. II or in any of the sub-boxes of Box No. III, the inventor or the inventor/applicant is not inventor for the purposes of all designated States or for the purposes of the United States of America: in such case, write "Continuation of Box No. II" or "Continuation of Box No. III" or "Continuation of Boxes No. II and No. III" (as the case may be), indicate the name of the inventor(s) and, next to (each) such name, the State(s) (and/or, where applicable, ARIPO, Eurasian, European or OAPI patent) for the purposes of which the named person is inventor;
- (iv) if, in addition to the agent(s) indicated in Box IV, there are further agents: in such case, write "Continuation of Box No. IV" and indicate for each further agent the same type of information as required in Box No. IV;
- (v) if, in Box No. V, the name of any State (or OAPI) is accompanied by the indication "patent of addition," or "certificate of addition," or if, in Box No. V, the name of the United States of America is accompanied by an indication "continuation" or "continuation-in-part": in such case, write "Continuation of Box No. V" and the name of each State involved (or OAPI), and after the name of each such State (or OAPI), the number of the parent title or parent application and the date of grant of the parent title or filing of the parent application;
- (vi) if, in Box No. VI, there are more than three earlier applications whose priority is claimed: in such case, write "Continuation of Box No. VI" and indicate for each additional earlier application the same type of information as required in Box No. VI;
- (vii) if, in Box No. VI, the earlier application is an ARIPO application: in such case, write "Continuation of Box No. VI", specify the number of the item corresponding to that earlier application and indicate at least one country party to the Paris Convention for the Protection of Industrial Property or one Member of the World Trade Organization for which that earlier application was filed.

2. If, with regard to the precautionary designation statement contained in Box No. V, the applicant wishes to exclude any State(s) from the scope of that statement: in such case, write "Designation(s) excluded from precautionary designation statement" and indicate the name or two-letter code of each State so excluded.

3. If the applicant claims, in respect of any designated Office, the benefits of provisions of the national law concerning non-prejudicial disclosures or exceptions to lack of novelty: in such case, write "Statement concerning non-prejudicial disclosures or exceptions to lack of novelty" and furnish that statement below.

Continuation of Box No. VI, Item (2): Serial No. not yet assigned for application filed on June 17, 2000.  
Inventors for this application are the same as those listed in Box III of this Request.

<b>Box No. VI PRIORITY CLAIM</b>		<input type="checkbox"/> Further priority claims are indicated in the Supplemental Box.		
Filing date of earlier application <i>(day/month/year)</i>	Number of earlier application	Where earlier application is:		
		national application: country	regional application:* regional Office	international application: receiving Office
item (1) 23 June 1999 23/06/99	60/140590	US		
item (2) 17 June 2000 17/06/00	Not yet assigned	US		
item (3)				
<input checked="" type="checkbox"/> The receiving Office is requested to prepare and transmit to the International Bureau a certified copy of the earlier application(s) ( <i>only if the earlier application was filed with the Office which for the purposes of the present international application is the receiving Office</i> ) identified above as item(s): <u>1 and 2</u> <i>* Where the earlier application is an ARIPO application, it is mandatory to indicate in the Supplemental Box at least one country party to the Paris Convention for the Protection of Industrial Property for which that earlier application was filed (Rule 4.10(b)(ii)). See Supplemental Box.</i>				
<b>Box No. VII INTERNATIONAL SEARCHING AUTHORITY</b>				
Choice of International Searching Authority (ISA) <i>(if two or more International Searching Authorities are competent to carry out the international search, indicate the Authority chosen; the two-letter code may be used):</i>		Request to use results of earlier search; reference to that search <i>(if an earlier search has been carried out by or requested from the International Searching Authority):</i> Date (day/month/year)      Number      Country (or regional Office)		
ISA/EP				
<b>Box No. VIII CHECK LIST: LANGUAGE OF FILING</b>				
This international application contains the following number of sheets:  request : 5 description (excluding sequence listing part) : 17 claims : 3 abstract : 1 drawings : 8 sequence listing part of description : _____ <b>Total number of sheets : 34</b>		This international application is accompanied by the item(s) marked below: 1. <input checked="" type="checkbox"/> fee calculation sheet 2. <input type="checkbox"/> separate signed power of attorney 3. <input checked="" type="checkbox"/> copy of general power of attorney; reference number, if any: 4. <input type="checkbox"/> statement explaining lack of signature 5. <input type="checkbox"/> priority document(s) identified in Box No. VI as item(s): 6. <input type="checkbox"/> translation of international application into (language): 7. <input type="checkbox"/> separate indications concerning deposited microorganism or other biological material 8. <input type="checkbox"/> nucleotide and/or amino acid sequence listing in computer readable form 9. <input checked="" type="checkbox"/> other (specify): Resolution Unsigned powers of attorney by inventors		
Figure of the drawings which should accompany the abstract:		Language of filing of the international application: English		
<b>Box No. IX SIGNATURE OF APPLICANT OR AGENT</b>				
Next to each signature, indicate the name of the person signing and the capacity in which the person signs (if such capacity is not obvious from reading the request).				
EVEREADY BATTERY COMPANY, INC.				
By: <u>Russell H. Toyer, Jr.</u> Russell H. Toyer, Jr. Patent Agent				

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1. Date of actual receipt of the purported international application:	2. Drawings:  <input type="checkbox"/> received:  <input type="checkbox"/> not received
3. Corrected date of actual receipt due to later but timely received papers or drawings completing the purported international application:	
4. Date of timely receipt of the required corrections under PCT Article 11(2):	
5. International Searching Authority (if two or more are competent): ISA/	6. <input type="checkbox"/> Transmittal of search copy delayed until search fee is paid.

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Date of receipt of the record copy by the International Bureau:

(19) World Intellectual Property Organization  
International Bureau



(43) International Publication Date  
28 December 2000 (28.12.2000)

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(10) International Publication Number  
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60/140,590 23 June 1999 (23.06.1999) US  
60/212,295 17 June 2000 (17.06.2000) US
- (71) Applicant (for all designated States except US): EVEREADY BATTERY COMPANY, INC. [US/US]; P.O. Box 450777, 25225 Detroit Road, Westlake, OH 44145 (US).
- (72) Inventors; and
- (73) Inventors/Applicants (for US only): JIN, Zhihong [US/US]; 1106 Starlight Lane, Cottage Grove, WI 53527 (US); KENNEDY, John, H. [US/US]; 5357 Agana Drive, Santa Barbara, CA 93111-1601 (US).
- (74) Agent: TOYE, Russell, H., Jr.; Eveready Battery Company, Inc., P.O. Box 450777, 25225 Detroit Road, Westlake, OH 44145 (US).
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- (84) Designated States (regional): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).
- Published:  
— With international search report.  
— Before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments.
- For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: PERFORMANCE ENHANCING ADDITIVES FOR ELECTROCHEMICAL CELLS

(57) Abstract: Alkaline battery cells comprising an anode, a cathode, a separator between the anode and the cathode, and an electrolyte are provided with an n-type metal oxide additive that improves electrochemical performance. The n-type metal oxide additive is either a doped metal oxide comprising a metal oxide modified by incorporation of a dopant, or a reduced metal oxide. The metal oxide may be selected from the group consisting of BaTiO<sub>3</sub>, K<sub>2</sub>TiO<sub>3</sub>, CoTiO<sub>3</sub>, SrTiO<sub>3</sub>, CaTiO<sub>3</sub>, MgTiO<sub>3</sub>, SiO<sub>2</sub>, CaO, TiO<sub>2</sub>, CoO, Co<sub>3</sub>O<sub>4</sub>, ZnO, SnO, SnO<sub>2</sub>, PbO<sub>2</sub>, Bi<sub>2</sub>O<sub>3</sub>, Bi<sub>2</sub>O<sub>3</sub>·3ZrO<sub>3</sub>, Bi<sub>12</sub>TiO<sub>20</sub>, Fe<sub>2</sub>O<sub>3</sub>-TiO<sub>2</sub>, Nb<sub>2</sub>O<sub>5</sub>, CaWO<sub>4</sub>, ZnMn<sub>2</sub>O<sub>4</sub>, and K<sub>2</sub>Cr<sub>2</sub>O<sub>7</sub>. Examples of dopant disclosed are: NbO<sub>2</sub>, Nb<sub>2</sub>O<sub>5</sub>, Ta<sub>2</sub>O<sub>5</sub>, WO<sub>3</sub>, GeO<sub>2</sub>, ZrO<sub>2</sub>, SnO<sub>2</sub>, ThO<sub>2</sub>, Fe<sub>2</sub>O<sub>3</sub>, In<sub>2</sub>O<sub>3</sub>, LiNiO<sub>2</sub>, and P<sub>2</sub>O<sub>5</sub>, In<sub>2</sub>O<sub>3</sub>, Sb<sub>2</sub>O<sub>5</sub>.

WO 00/79622 A1

# INTERNATIONAL SEARCH REPORT

**International Application No**

PCT/US 00/17561

**A. CLASSIFICATION OF SUBJECT MATTER**  
IPC 7 H01M4/62 H01M6/16

According to International Patent Classification (IPC) or to both national classification and IPC

### 8. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 HO1M

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ

### C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 747 982 A (EVEREADY BATTERY INC) 11 December 1996 (1996-12-11) claims 1-19	1-3,5-8, 13
X	WO 98 15987 A (MERCK PATENT GMBH ;PFAFF GERHARD (DE); GLAUSCH RALF (DE); HILARIUS) 16 April 1998 (1998-04-16) page 7, line 10 - line 15; claims 1-10	1-3,5-7
A	US 5 532 085 A (DAVIS STUART M ET AL) 2 July 1996 (1996-07-02) claims 1-14	1-23
A	WO 92 17910 A (BATTERY TECHNOLOGIES INC) 15 October 1992 (1992-10-15) claims 1-4	1-23
	-/-	

**Y** Further documents are listed in the continuation of box C.

**X** Patent family members are listed in annex.

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"O" document referring to an oral disclosure, use, exhibition or other means

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**T** later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

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\*& document member of the same patent family

Date of the actual completion of the international search

**29 September 2000**

Date of mailing of the international search report

18/10/2000

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# INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 00/17561

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

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A	DE 195 46 333 A (GRILLO WERKE AG) 20 June 1996 (1996-06-20) claims 1-7	1-23
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